

CROSS WIND TRAP STRIPS (ACRE)

CODE 589C

MONTANA TECHNICAL GUIDE

SECTION IV

DEFINITION

Herbaceous cover resistant to wind erosion, established in one or more strips across the prevailing wind erosion direction.

Technical Guide (FOTG), Section IV, Practice Standards and Specifications, 342–Critical Area Treatment and 380–Windbreak/Shelterbelt Establishment, including seeding rates and dates.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following:

- Reduce soil erosion from wind.
- **Reduce plant stress and damage from wind, wind erosion and windblown sediment.**
- Induce deposition and reduce transport of wind-borne sediment and sediment-borne contaminants downwind **establishing a stable area to resist wind erosion.**
- **Minimize soil-bound pollutants such as nutrients, pesticides, and organic solids from downwind deposition into sensitive areas.**
- Protect growing crops from damage by wind-borne soil particles.
- Provide food and cover for wildlife.

CRITERIA

General Criteria Applicable To All Purposes Named Above

Trap strips must be designed to create a stable condition. For a trap strip to be stable, it must be:

- a minimum of 15 feet wide during critical erosion periods with vegetation exceeding one foot height.
- a minimum of 25 feet wide during critical erosion periods with vegetation less than one foot height.
- 50 percent or greater vegetated cover.
- 50 to 75 stems per square foot.

Selected species must have stiff, erect stems capable of enduring the effects of wind during critical erosion periods. Selection of plant species should be based on the following criteria:

- ability to withstand snow drifting
- ability to remain erect during erosive periods
- tolerance to annual predicted sediment deposition
- adaptation to the soil condition onsite

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to cropland, or other land where crops are grown.

This standard includes the location of cross wind trap strips and their management for identified uses.

Criteria for the establishment of perennial herbaceous vegetation are found in the Field Office

NOTE: This type of font (**AaBbCcDdEe 123..**) indicates NRCS National Standards.
This type of font (**AaBbCcDdEe 123..**) indicates Montana Supplement.

a. Number of Strips:

A cross wind trap strip system shall consist of at least two strips.

b. Width of Trap Strips:

Trap strips shall be wide enough to trap saltating soil particles and store wind-borne sediments originating upwind.

The width of the trap strip shall be at least 15 feet, when vegetation or stubble in the strip will normally be one foot or more in height during periods when wind erosion is expected to occur.

The minimum width of the trap strip shall be at least 25 feet when the effective height of the vegetation or stubble in the strip will normally be less than one foot during periods when wind erosion is expected to occur.

When annually seeded and harvested trap strips of small grains are used, design can be adjusted to the combine header width if desired (no less than minimum widths listed above.)

Determine trap strip design width and spacing by:

1. Determining the contributing area "L".
2. Estimating the wind erosion rate in tons per acre per year from the contributing area.
3. Selecting a trap strip width based on length and deposition depth less than or equal to 2.4 inches per year.

See specification for step-by-step design procedures.

c. Vegetative Cover:

Trap strips may consist of perennial or annual plants, growing or dead. Plant materials shall be selected for the following characteristics:

The following step-by-step procedure describes how to design a cross wind trap strip:

1. Determine the contributing area (unsheltered distance) L. [EXAMPLE: 20 acres]
2. Calculate the wind erosion rate of the contributing area using the WEQ management period method found in FOTG, Section I, Erosion Prediction. [EXAMPLE: 5 tons/per/acre/year]

3. Sum the total erosion from the contributing area. $TOTAL\ TONS = (ACRES) \times (EROSION\ RATE)$
[EXAMPLE: 20 ac x 5 t/a/yr = 100 tons/yr]

4. Estimate the percent of saltation and surface creep trapped in the cross wind trap strip. Saltation factors range from 50-80 percent

of the total wind erosion sediment transported as saltation and surface creep. [EXAMPLE: 80%]

5. Calculate the total sediment that can be potentially trapped in the strip. $Soil\ trapped\ in\ strip = (TOTAL\ TONS/AC\ FROM\ CONTRIBUTING) \times (SALTATION\ FACTOR)$.

[EXAMPLE: (100 t/yr) x (80%) = 80 tons/yr]

6. Find the bulk density value for the design soil used in the soil loss prediction (Chemical and Physical Properties Table in FOCS of published soil survey manuscripts). From TABLE 1, determine the depth per ton of soil. [EXAMPLE: soil has bulk density of 1.3. Depth is 0.007 inches per ton of soil]

7. Select trap strip width: 15, 20, 25, or 30 feet. [EXAMPLE: 15 feet] then, calculate trap strip acres = (strip width-feet) x (trap strip length-feet) / (43,560 square feet per acre) [EXAMPLE: 20-acre rectangular field 1,320 ft by 660 ft calculation for a 15-foot wide trap strip is:
 $(15\ ft) \times (1,320\ ft) / (43,560\ sq\ ft/ac) = 19,800\ sq\ ft / 43,560\ ft/ac = 0.45\ acre$].

8. Calculate deposition depth (soil trapped in ton/acre) x (0.007 inches/ton of soil/acre) / (trap strip acres) [EXAMPLE: (80 tons) x (0.007 in/ton) / (0.45 ac) = 1.24 inches/year]

TABLE 1. Relative Soil Bulk Density Relationships to Depth of Soil.

SOIL BULK DENSITY (g/cc)	WEIGHT (lbs/ft ³)	DEPTH/TON (inches)
0.5	31.2	0.018
0.6	37.4	0.015
0.7	43.7	0.013
0.8	49.9	0.011
0.9	56.2	0.010
1.0	62.4	0.009
1.1	68.6	0.008
1.2	74.9	0.007
1.3	81.1	0.007
1.4	87.4	0.006
1.5	93.6	0.006
1.6	99.8	0.005
1.7	106.1	0.005
1.8	112.3	0.005
1.9	118.6	0.005
2.0	124.8	0.004

c. Vegetative Cover:

Trap strips may consist of perennial or annual plants, growing or dead. Plant materials shall be selected for the following characteristics:

- Adaptation to the site.
- Erect during **critical** wind erosion periods.
- Tolerant to sediment deposition.

Additional Criteria To Reduce Soil Erosion From Wind

a. Location of Trap Strips:

Trap strips established for this purpose shall be located as follows:

- At the windward edge of fields; or
- Immediately upwind from areas within fields to be protected from erosion or deposition; or
- In recurring patterns interspersed between erosion-susceptible strips.

b. Direction and Width of Erosion-Susceptible Strips:

When trap strips are installed in patterns alternated with erosion-susceptible crop strips, and the direction of strips deviates from perpendicular to the prevailing wind erosion direction, the width of the erosion-susceptible strips shall be correspondingly reduced.

The effective width of strips shall be measured along the prevailing wind erosion direction during those periods when wind erosion is expected to occur. It shall not exceed the width permitted by the soil loss tolerance (T), or other planned soil loss objective.

The width of strips shall be determined using current approved wind erosion prediction technology. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Induce Deposition and Reduce Transport of Wind-borne Sediment and Sediment-Borne Contaminants Downwind

Location of Trap Strips:

Trap strips shall be established immediately upwind from areas to be protected from sediment deposition. There shall be no erosion-exposed area located between the trap strip and the area to be protected from sediment deposition.

Additional Criteria To Protect Growing Crops From Damage By Wind-borne Soil Particles

a. Placement of Trap Strips:

Trap strips shall be established immediately upwind from areas used for sensitive crops. There shall be no erosion-exposed area located between the trap strip and the crop to be protected.

b. Direction and Width of Strips of Sensitive Crops:

Where trap strips are installed in patterns alternated with strips of crops susceptible to damage by wind-borne soil particles, and the direction of strips deviates from perpendicular to the prevailing wind erosion direction, the width of strips planted to sensitive crops shall be correspondingly reduced.

The effective width shall be measured along the prevailing wind erosion direction during those periods when sensitive crops are susceptible to damage by wind-borne soil particles. It shall not exceed the width permitted by the crop tolerance to wind erosion. **Crop tolerance to wind erosion is the maximum rate of soil blowing that crop plants can tolerate without significant damage due to abrasion, burial, or desiccation. Crops most susceptible to wind include vegetable crops and crop seedlings. Crops that are characteristically tall may be susceptible to lodging (EXAMPLE: non-dwarf varieties of small grains.)**

The width of the crop strips shall be determined using current approved wind erosion prediction technology to estimate wind erosion during specific crop stage periods. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Provide Food and Cover for Wildlife

a. Vegetative Cover:

Trap strips shall consist of vegetation that provides food and/or cover for the targeted wildlife species.

b. Trap Strip Height:

The minimum height of trap strips designed for this purpose shall have a minimum expected height that provides adequate cover for the targeted wildlife species.

c. Trap Strip Width:

For wildlife purposes, trap strips should be at least 30 feet wide. Trap strips may be located next to wetland areas, drainage ditches, or road ditches for maximum benefits.

CONSIDERATIONS

The effectiveness of Cross Wind Trap Strips is maximized when strips are oriented as close to perpendicular as possible to the prevailing wind erosion direction for the period for which the system is designed.

Selection of plants for use in trap strips should favor species or varieties tolerant to herbicides used on adjacent crops or other land uses.

When trap strips are designed to enhance wildlife habitat, plant species diversity within the strip should be encouraged. Trap strips that result in multiple structural levels of vegetation within the strip will maximize wildlife use. Some plants are damaged by blowing wind as well as by wind-borne sediment. In such cases, the spacing between trap strips may have to be reduced from that obtained using wind erosion prediction technology.

Drifting snow or grazing by wildlife may reduce the trapping capability of trap strips. In such cases, other conservation practices, including the residue management practices—422A—Herbaceous Wind Barriers, etc., may be used with, or as alternatives to, trap strips to achieve the conservation objective.

PLANS AND SPECIFICATIONS

Specifications for establishment and maintenance of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and Operation and Maintenance described in this standard.

Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

The attached job sheet is required for design and implementation of this practice.

OPERATION AND MAINTENANCE

After establishment, perennial trap strips shall be fertilized as needed to maintain plant vigor. Weeds shall be controlled with mowing or chemicals.

Mowing or grazing of trap strips shall be managed to allow regrowth to the planned height before periods when wind erosion or crop damage is expected to occur. **Grass vegetation should be managed to a height of at least 12 inches, with a minimum stem density of 50-75 stems per square foot, and more than 50 percent ground cover during those periods in which wind erosion is expected to occur. Trap strips should be mowed in time to allow for regrowth to the planned height before periods of wind erosion or crop damage is expected.**

Spot spray or mow weeds as necessary. Noxious weeds must be controlled according to state noxious weed laws.

Wind-borne sediment accumulated in trap strips shall be removed and distributed over the surface of the field as determined appropriate. **Remove entrapped soil sediment before the sediment reaches 6 inches in the trap strip filter area.**

Burning of warm season grasses is not allowed unless new growth will obtain the minimum height criteria during critical periods.

Trap strips shall be re-established or relocated as needed to maintain plant density and height.

When barriers are designed to enhance wildlife habitat, they shall not be mowed or pruned unless their height and width exceeds that required to obtain the wildlife objective and they become competitive with the adjoining land use. When mowing or pruning is necessary, it shall be done only during non-nesting season.

Trap strips should not be used as travel lanes. Flattened grass is not effective in trapping saltating soil.

Fertilize trap strips as necessary. Rates should be according to soil test analysis. All phosphorus applied must be incorporated to prevent phosphorus movement into nearby surface water (except in no-till seeding). Nitrogen applications are delayed until after plant emergence and establishment to minimize nitrogen losses from leaching or runoff to adjacent surface waterbodies.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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MONTANA CONSERVATION PRACTICE SPECIFICATION

PRODUCER _____

FIELD NO., TRACT, OR CTU _____

SCOPE. This specification provides guidelines for establishment and maintenance of cross wind trap strips.

PURPOSE OF ESTABLISHMENT.

- ☐ Provide wildlife habitat
 ☐ Reduce pollution from wind-borne material
☐ Protect crops from wind-borne soil
 ☐ Other
☐ Reduce soil erosion from wind

1. Soil Map Unit(s) _____; Texture _____

LOCATION AND LAYOUT	STRIP 1	STRIP 2	STRIP 3
Cultivated width (ft)			
Grassed strip width (ft)			
Grassed strip length (ft)			
Acres in buffer strip			

PLANT MATERIAL INFORMATION			
SPECIES/CULTIVAR BY ROW NUMBER STRIP #1	SEEDING RATE (LB/AC)	SEEDING DATE	RECOMMENDED FERTILIZER N; P ₂ O ₅ ; K ₂ O (lb / ac)
1			
2			
3			
STRIP #2			
1			
2			
3			
STRIP #3			
1			
2			
3			

SITE PREPARATION

Prepare firm seedbed. Apply fertilizer according to recommendations.

PLANTING METHODS

Drill grass/legume seed no more than 3/8 inch deep uniformly over area. Establish stand of vegetation according to recommended seeding rate. If necessary, mulch newly seeded area with _____ tons per acre of mulch material. If a companion crop is necessary apply at _____ pounds per acre. Clip companion crop or harvest before it head out.

OPERATION AND MAINTENANCE

Maintain original width and depth of the grass area. Harvest, mow, reseed, and fertilize to maintain plant density, vigorous plant growth, and to remove plant nutrients. Inspect after major storms, remove trapped sediment, and repair any eroding areas. Shut off pesticide sprayers when turning on a field border.

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE**CROSS WIND TRAP STRIPS** (ACRE)**CODE 589C****MONTANA CONSERVATION PRACTICE SPECIFICATION**

If needed, an aerial view of the field illustrating strip widths, prevailing wind direction, and field layout can be shown below. Other relevant information, such as adjacent field or tract conditions including structures and crop types, the positioning of multiple or single row sets across a field or tract, and complementary practices and additional specifications may be included.

Scale 1" = _____ ft. (NA indicates sketch is not to scale)

ADDITIONAL SPECIFICATIONS AND NOTES:
